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## ON THE CORE FUNCTION OF ENGLISH SENSORY ADJECTIVES\*

### 1 INTRODUCTION

#### *1.1 The Meanings of Sensory Adjectives*

The conventional metaphorical meanings of sensory adjectives can be classified into six types based on the meanings of modified nouns:

- |        |  |        |
|--------|--|--------|
| (1) a. | heavy sadness, sharp sadness, hot anger, bitter sorrow, hot love | (COCA) |
| b.     | tough situation, bitter situation, high quality                  | (COCA) |
| c.     | low morality, high virtue, clear ethics                          | (COCA) |
| d.     | sharp focus, heavy wind, vivid contrast                          | (COCA) |
| e.     | heavy fine, high price, high salary                              | (COCA) |
| f.     | heavy labor, tough task, stiff competition                       | (COCA) |

In (1a-f), respectively, sensory adjectives describe the feelings, evaluation, morality judgment, degree of intensity, amount, and difficulty involved in painstaking activities. In addition, as Ullmann (1951), Williams (1976) and Sadamitsu (2002, 2004) have observed, sensory adjectives in synesthetic expressions can metaphorically describe other perceivable stimuli.<sup>1, 2</sup>

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<sup>1</sup> Ullmann (1951), Williams (1976), and Sadamitsu (2002, 2004) have focused on the metaphorical uses of adjective constructions such as *sweet voice* and *warm color*, which describe other perceivable properties. There are restrictions to these expressions on the combinations of nouns and sensory adjectives that metaphorically describe the characteristics of perceivable stimuli. As Ullmann (1951) and Williams

Although these analyses have clarified in detail the mechanism of meaning changes in synesthetic adjectives and their restrictions, the types of metaphorical meanings expressed in (1a-f) have not been similarly clarified. Therefore, this study aims to elucidate the mechanism of meaning changes and the restrictions on them in metaphoric uses of sensory adjectives. By incorporating both the deduction and ad hoc concept construction proposed in the Relevance Theory (Sperber and Wilson (1986/95), Carston (2002), Wilson and Carston (2006)), we will identify how generalized information on perceivable stimuli becomes shared by the literal and metaphorical meanings of sensory adjectives. We will assume that adjectives describe graded properties. Based on such a characteristic of adjectives, we will elucidate that the metaphorical meanings in (1a-f) share the same function. We will also analyze how these types of metaphorical meanings are understood based on their common functions related to meaning, which constitutes the core function of sensory adjectives. This function relates to the intensity of experiences and phenomena, and it is inherently present in both the literal meanings of sensory adjectives and perceivable stimuli.

## 1.2 Organization of the Paper

This paper is organized as follows. In section 2, we will examine previous analyses of adjective use in metaphorical expressions, notably the conceptual-metaphoric analysis proposed by Lakoff and Johnson (1980) and Lakoff (1987), and explain why different meanings such as those indicated in (1a-f) are likely to be generalized based on the scale of various properties. We will also examine the extent to which these meanings can be generalized across usages, such as the examples in (1a-f) from the viewpoint of the co-occurrence of two experience types and image-schemas. Furthermore, by reviewing Wilson and Carston (2006), we will consider whether various types of meanings denoted by sensory adjectives are continuous. In section 3, we will summarize the insight of the Relevance Theory, as proposed by Sperber and Wilson (1986/95). In particular, we will examine the manner in which ad hoc concepts are constructed in the metaphorical interpretation of expressions and how implicatures are understood through deduction. In section 4, it will be argued that different conventional metaphorical meanings of sensory adjectives are accompanied

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(1976) have highlighted, the semantic changes in such adjectives occur in the following pattern: [Touch] → [Taste] → [Smell] → [Vision] → [Sound]. When this condition is not met, the metaphorical uses of sensory adjectives sound less natural. This is because sensory adjectives that originally describe less developed aspects of perception metaphorically describe its more developed aspects. Thus, for example, *noisy taste* and *bright smell* are hardly used. One implication of this is that in these types of expressions, adjectives describing a smell are rarely used to describe other senses (Sadamitsu (2002, 2004)). This is because the source of a smell is non-identifiable. Accordingly, adjective meanings such as *fragrant* are less likely to change.

<sup>2</sup> In contrast to Kusumi (1988), we assume that metaphorical uses of sensory adjectives also describe evaluations of non-perceivable stimuli, moral judgment, the intensity of various phenomena, difficulty, and quantity. These patterns of meaning changes are widely evinced in metaphorical uses of various sensory adjectives.

by the core function related to the description of intensity.<sup>3</sup> Furthermore, this type of information employed as premises for deduction will also be presented. For this reason, the commonalities and continuity between various metaphorical meanings will be explained. We will also examine how this core function determines the differences in more specified metaphorical meanings, while indicating the restrictions on their metaphorical interpretations. Finally, section 5 will conclude our analysis.

## 2 PREVIOUS ANALYSES

In this section, we will review previous analyses of the metaphorical uses of sensory adjectives. Our main goal is to establish the extent to which the characteristics of various metaphorical meanings and literal meanings are generalized. We will also see that these two types of meanings are generalized based on the scales of perceivable properties.

### 2.1 Conceptual Metaphors

According to Lakoff and Johnson (1980) and Lakoff (1987), the metaphorical use of sensory adjectives is motivated by conceptual metaphors, which affect our understanding of various abstract notions; thus, metaphorical expressions constitute the manifestations of such understanding. If conceptual metaphors motivate the use of metaphorical expressions, the co-occurrence of the perception of physical stimuli and other types of experiences also motivate their use:

- (2) a. The number of errors he made is incredibly *low*.  
(Lakoff and Johnson (1980: 16))
- b. Things are at an all-time *low*. (Lakoff and Johnson (1980: 16))
- (3) a. He was *red* with anger. (Lakoff (1987: 381))
- b. Don't get *hot under the collar*. (Lakoff (1987: 382))

In (2a), the LESS IS DOWN metaphor motivates the use of *low*, in which the scarcity of an item is understood in terms of the height of an accumulated substance or resource. In (2b), the BAD IS DOWN metaphor motivates the use of *low*. That is, the evaluation of something as poor or low quality is conceptually understood in terms of its low physical vertical extent. In (3a, b), the ANGER IS HEAT metaphor motivates the use of *red* and *hot under the collar*. This is because anger increases a person's body temperature and reddens the face, and the notion of anger is understood

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<sup>3</sup> The metaphorical uses of sensory adjectives sometimes have established or fixed meanings. Such meanings are communicated by the given adjectives repeatedly across various contexts. The term "conventional" is used to refer to this characteristic.

Based on this claim, we can explain how metaphorical meanings are motivated. However, generalizing the content of a metaphor's source domain would be limitless and therefore almost impossible to undertake.<sup>4</sup> On reading (4), we may assume that the generalized conceptual metaphor UNPLEASANT MOOD IS AN UNPLEASANT PERCEIVABLE STIMULUS motivates the metaphorical uses of sensory adjectives:

- However, as (5) shows, it is impossible to generalize this:

- Although a sticky entity evokes unpleasantness, the metaphorical use of *sticky* sounds unnatural in (5). Rather, the meanings of the adjectives in (4) are more likely to be generalized under the influence of other factors such as the strength of the stimuli, which are also likely to be evocable from the use of the adjectives in (4).

In (6), it is evident that both the conceptual metaphor A DIFFICULT TASK IS BITTERNESS and a more generalized conceptual metaphor A DIFFICULT TASK IS AN UNPLEASANT STRONG TASTE work. However, this generalized conceptual metaphor does not work in the *sour job* example. It is also discernible that the specified conceptual metaphor A DIFFICULT TASK IS SOURNESS is not functioning in this phrase. Nevertheless, we can further generalize that the conceptual metaphor A DIFFICULT TASK IS AN UNPLEASANT STRONG STIMULUS motivates the use of both *bitter task* and *tough task*. Therefore, it remains unclear which characteristics of the source domain or the types of conceptual metaphors motivate the metaphorical use of sensory adjectives.

Clausner and Croft (1999) analyzed the meanings of adjectives from the domain and image schema perspectives. Moreover, since some properties described by

<sup>4</sup> Regarding the non-generalizability of content included in source domains, see Vervaeke and Kennedy (1996).

adjectives are gradable, they proposed that the SCALE image schema works to determine the meanings of sensory adjectives. In their view, image schemas represent schematic patterns arising from image-schematic domains, such as *containers*, *paths*, *links*, *forces*, and *balances* that recur in a variety of embodied domains and structures of our bodily experience (Clausner and Croft (1999: 14)). Hence, adjective meanings are regarded as various points on a scale. For example, the meaning of *sharp* is regarded as a point beyond the certain norm of the SHARPNESS scale (Clausner and Croft (1999: 17)).

Grady (2005) discussed metaphorical expressions that describe abstract concepts from the viewpoint of primary metaphors, which are based on the generalization of the shared properties of image schemas and target concepts. He proposed that the source concepts of primary metaphors include image content, whereas the corresponding target concepts include response content. These two schemas share a super-schematic structure, and such structure is a necessary condition for primary metaphors. For example, there are image schemas for concepts such as heaviness, upward movement, and heat. By contrast, response schemas include concepts such as difficulty, an increased amount, and anger. Between these two types of schemas, the scalar properties are shared (Grady (2005: 44-50)).

Furthermore, both of these studies have claimed that the structuring of an abstract concept has an experiential basis (Clausner and Croft (1999: 14-15), Grady (2005: 48-49)). The correspondence between *more* and *up* exemplifies the notion that when we add more of a substance to a pile or container, the level rises, and thus the correspondence is based on a correlation between our experiences. This enables the structuring of our concept of *amount*.

According to this claim, the metaphorical uses of *heavy* in (1a, e, and f) all involve the super-schema for “scalarness.” This super-schema is shared between the image schema for weight and the respective response schemas involving depression, quantity, and difficulty. The presence or absence of super-schemas explains why some metaphorical uses of sensory adjectives are possible. Therefore, it is also possible to suppose a generalization in the process of meaning changes of sensory adjectives, based on the shared super-schemas.

Although these two studies have claimed that the correlation of two experiences determines the extended adjective meanings, this correlation can also be explained from the similarities between two experiences. Consider (7a, b) and (8a, b):

- (7) a. As the burden gets heavier, the task becomes more difficult.
- b. A heavy burden and a difficult task are similar in that both involve a considerable degree of pain.
- (8) a. ? As the surface of an object gets smoother, their relationship becomes more improved.
- b. The smooth surface of the object and smooth relationship are similar in that both are pleasant.

In (7a), the correlation (the proportion) between physical heaviness and difficulty leads to the naturalness of this expression. This correlation can also be explained

from the viewpoint of similarity in (7b). Because of the similarity shared by this heaviness and difficulty, (7b) sounds natural. In (8a), on the other hand, it is difficult to discern the correlation between physical smoothness and a good relationship, and this leads to the unnaturalness of this expression. Even if a correlation between two experiences is not involved, it is possible to ascertain their similarities, as (8b) illustrates.

### 2.3 Wilson and Carston (2006)

According to Wilson and Carston (2006), the psychological-emotional senses of sensory adjectives are the metaphorical extensions of their basic physical senses, such as COLD. In this view, the psychological-emotional senses arise through the broadening of the basic senses to create broader superordinate concepts such as COLD\*, which are applicable to psychological aspects, emotions, and perceptions. The involvement of superordinate concepts is evident in (9) and (10), where the uses of sensory adjectives describe both the physical and non-physical state in the same sentences:

- (9) a. The weather is cold like ice.
- b. His character is cold like ice.
- c. The reality is cold like ice.
- d. His focus on the theme is sharp as a tack.
- e. The admission hung in the air, as heavy as shackles, and he paused. (COCA)
- f. The fine for illegal parking is heavy as fetters.
- (10) a. The temperature of the town, the reality, and people's feelings toward the reality are cold.
- b. Both his feelings and the wind are heavy.
- c. Both his feelings and the fine for illegal parking are heavy.
- d. Both his feelings and the job are heavy.
- cf. #Both the sunlight and the black bag are light.

From these facts, in contrast to the zeugmatic use of the homonymous *light*, it is clear that sensory adjectives have a superordinate meaning applicable to feelings, evaluation, intensity, an amount, and difficulty.

However, as Ritchie (2013: 61-66) noted, the attributes that are transferred from the literal concepts to the metaphorical concepts must be interpreted before the stipulated cognitive processing can occur in Wilson and Carston's analysis. Moreover, how a superordinate concept is constructed and applied to both physical and psychological-emotional experiences is not explained in their analysis.

Other obstacles to this approach remain. For instance, to explain the more varied metaphorical meanings of abstract concepts in (1a-f), more generalized ad hoc concepts would be required. To explain the involvement of such general concepts, it

must be clarified what types of assumptions and inferences contribute toward understanding these metaphorical meanings.

To address the various questions raised in the literature and in this section, the next section will analyze metaphorical uses of sensory adjectives by applying a modified model of Relevance Theory to explain the difference between the degrees of physical stimuli and non-physical properties. Considering this relationship, we do not have to assume that the metaphorical senses of sensory adjectives serve as deductive premises. In our analysis, the unnaturalness of atypical metaphorical uses of sensory adjectives will be explained by the comparative difficulties of deduction, which are attributed to a lower level of accessibility of the required assumptions. Moreover, we will elucidate the exact deduction process of metaphorical meanings. In addition, we will clarify one generally shared characteristic of the metaphorical meanings of sensory adjectives and explain the continuity between them.

In addition, the assertion that the meanings of sensory adjectives in such forms of expressions are loosened in a set pattern is discussed. We claim that sensory adjectives have one core function; namely, describing intensity. We assume that this function is at work because various linguistic disciplines, including formal semantics and cognitive linguistics, claim the plausibility of the involvement of scalarness in adjective meanings, and this claim is compatible with this core function.<sup>5</sup> Therefore, the assumptions employed as deductive premises of metaphorical meanings include information on intensity; furthermore, such meanings are understood by constructing superordinate ad hoc concepts in relation to particular contexts. Moreover, we will clarify that the core function is accompanied by slight differences in literal meanings that depend on the idiosyncrasies of each adjective, and that such differences produce some unnatural metaphorical uses of sensory adjectives.

### 3 THEORETICAL PREMISE: RELEVANCE THEORY

According to the Relevance-guided comprehension heuristic, a recipient (listener or reader) follows the path of least effort to interpret utterances. As the recipient travels on this path, the meanings of homonyms, such as *bank*, are disambiguated. The referents of pronouns, definite noun phrases, and other deictic expressions are resolved through saturation. At the same time, the recipient infers information omitted from an utterance. Through these steps, the listener or reader understands the explicature(s) of the utterance (Sperber and Wilson (1986/1995: 183-193)); in other words, what is explicitly communicated.

The interpretation of utterances also involves deduction leading to the comprehension of implicatures. To derive an implicature, we perform deduction utilizing explicatures, recipients' memories, and contextual assumptions as premises (Sperber and Wilson (1986/95: Ch. 4)), Carston (2002: Ch. 2 and Ch. 5)). For example, consider (11):

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<sup>5</sup> For a formal semantic analysis of the adjectives describing degree, see Siegel (1980).



- (11) Caroline is our princess. (Carston (2002: 347))

If the listener identifies Caroline as the Princess of Monaco and the speaker is a Monégasque, then (11) communicates a truism. However, if the listener hears (11) during a criticism of Caroline's upbringing, his or her deductive reasoning will proceed using the explicature of this utterance as a premise while using an assumption about how a particular princess of a specific country is raised as another premise; for example, the listener may assume contextually that a particular princess is an indulged and spoiled person. From these premises, it is understood that Caroline is or is growing up to be an indulged and spoiled person. In this case, the information about properties of a particular princess and the derived conclusion are considered to be implicatures, and thus this utterance is interpreted as the criticism of Caroline (Carston (2002: 347)).

In addition to the emergence of implicatures, an ad hoc concept is also constructed in interpreting (11). Such a concept either broadens or narrows the literal concept directly referred to by a word; in other words, it is either similar to the literal concept or entirely different from it (Carston (2002: 321-334)).<sup>6</sup> For example, the word *princess* literally denotes a female person with a particular position in a royal family, but in correspondence with the given implicature, a broadened concept PRINCESS\* is constructed, including both indulged and spoiled princesses as well as indulged and spoiled women/girls who do not belong to a royal family. Moreover, when an ad hoc concept is constructed in relation to the content of an implicature, the explicature of the relevant utterance is adjusted. Here, since this utterance implicates that Caroline is an indulged and spoiled princess, the word *princess* comes to refer to this type of princess or sense of princess. This process of utterance interpretation is called "mutual adjustment."

#### 4 ANALYSIS OF THE MEANINGS OF SENSORY ADJECTIVES

##### 4.1 On the Generalization of Metaphorical Meanings

As discussed in subsections 2.1-2.3, the metaphorical meanings of sensory adjectives are highly generalized. In this section, we will identify the extent to which they are generalized based on the commonality between their non-metaphorical and metaphorical meanings. Specifically, we will identify their commonality from the perspective of the degrees of physical stimuli described by sensory adjectives.

First, as (12a-j) illustrate, sensory adjectives describe the degree of properties in their literal senses. Various adjectives describing degrees are interchangeable with sensory adjectives without altering the meanings of these two types of adjectives

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<sup>6</sup> Both the broadening and narrowing of literal concepts are sometimes involved in interpreting metaphorical expressions at the same time depending on their types (Carston (2002: 321-334)).

regarding the intensity of physical stimuli and physical properties:

- (12) a. My aunt's and grandmother's baggage is captured on film as it's being hauled to the train in slow motion, owing to its {extreme/heavy} weight and inordinate number of pieces.  
(adapted from COCA)
- b. Hasan told him he has no feeling in his legs and he has {extreme/sharp} pain in his hands. (adapted from COCA)
- c. Most palates can't handle the {strong/ bitter} taste of pure dark chocolate. (adapted from COCA)
- d. The low population of francolins in June seems to be due to the {extreme/hot} temperature in the game reserve.  
(adapted from COCA)
- e. The {gentle/sweet} taste in whiskey is now even gentler.  
(adapted from the California Digital Newspaper Collection)
- f. Laurie got out of the car and shivered despite the afternoon's {mild/warm} temperature. (adapted from COCA)
- g. The mechanism of action for reducing pain is believed to be related to decreased nerve conduction velocity of pain fibres, as observed with {decreased/cold} temperature.  
(adapted from COCA)
- h. I intend to study the effects of {extreme/high} altitude on a very special person. (adapted from COCA)
- i. If you have {strong/vivid} color on one wall, you need to balance it with another strong color. (adapted from COCA)
- j. The fabric wicks away moisture, has four-way stretch and a fairly {mild/smooth} touch. (adapted from COCA)

As indicated in (12a-j), sensory adjectives mainly describe the degrees of physical properties and physical stimuli, and this function is shared by other adjectives describing degree.

Second, as (13a-g) evince, sensory adjectives also metaphorically describe the degrees of properties. Various adjectives describing degrees are interchangeable with sensory adjectives, and such alternation does not change their meanings at the level of intensity:

- (13) a. A fireman from Norway won the Iditarod Trail Sled Dog Race on Thursday, fighting {extreme/heavy/bitter/high} wind.  
(adapted from COCA)
- b. 27 Reader-response critics provide a needed corrective move away from the {extreme/sharp} focus on the text.  
(adapted from COCA)
- c. His {gentle/sweet/warm} voice soothed and caressed.  
(adapted from COCA)
- d. He acted under the influence of {extreme/hot} anger.

- (adapted from COCA)
- e. Wrap all of these factors together -- the greater emphasis on attachment and stimulation and the {decreased/cold} concern about spoiling. (adapted from COCA)
- f. In {strong/vivid} contrast with these sites in the Lake Victoria basin, there is no fishing and very little hunting in Elmenteitan sites. (adapted from COCA)
- g. His stomach was behaving better these days-and the seas stayed {mild/smooth}. (adapted from COCA)

From these examples, it is clear that the main function of the sensory adjectives in (12a-j) is also at work in (13a-g). Evidently, the core function of sensory adjectives is to describe degrees, and this leads to the deduction and understanding of the metaphorical meanings connoted by the sensory adjectives in (13a-g). The examples in (12a-j) and (13a-g) corroborate that both the literal and metaphorical uses of sensory adjectives share the same function of describing degrees, a similarity shared by other adjectives describing degrees. For these reasons, we will term this function the core function of sensory adjectives.

To summarize, the meanings of sensory adjectives can be generalized; moreover, we have also observed that sensory adjectives can originally convey the degrees of bodily sensations, and that they can metaphorically describe the degrees of non-bodily properties or phenomena and the degrees of psychological-emotional aspects that depend on collocations. In addition, the literal descriptions of physical properties are parallel with the metaphorical descriptions of other properties that entail using sensory adjectives to describe their degrees. Therefore, such metaphorical meanings are likely to share information related to the levels of an intensity scale. Moreover, because of the generalizability, it is possible to assume that the recipient stores this kind of information in his or her memory and that such information is highly accessible to the recipient. In the following subsection, we will verify how these types of metaphorical meanings and more specified meanings can be understood through deduction.

#### *4.2 Understanding Intensity in Sensory Adjectives through Deduction*

In the previous section, we ascertained the degree to which the metaphorical meanings of sensory adjectives can be generalized based on the common information conveyed by both the literal and metaphorical meanings of such adjectives. In this section, we will discuss in detail how such information contributes to the understanding of the metaphorical meanings of sensory adjectives through deduction.

Here, we will see how the core function of describing intensity contributes to the process of deduction. Consider the metaphorical uses of the sensory adjective *heavy* in (13a). The recipient understands the meaning of this adjective based on his or her access to the explication of this utterance and to the following assumption: If

something is heavy, it engenders a remarkable sensation and is, thus, extreme. From this assumption, it is understood that the *wind* in (13a) is remarkable and extreme. If this conclusion is understood as constituting the implicature of this utterance, a superordinate ad hoc concept HEAVY\* is constructed and applies to the intensity and remarkableness shared by the degrees of wind and of physical heaviness. The same deduction method is also involved in the metaphorical use of other sensory adjectives in (13a, b), which describe wind strength and the degree of focus on the text. Therefore, the process of deduction involves access to the degree and remarkableness of physical stimuli. This type of information serves as the second premise for deduction, and further general information applicable to non-bodily aspects is derived as implicatures. Since the use of sensory adjectives informs the recipient of more generalized information that also includes non-bodily aspects, a superordinate ad hoc concept is constructed. Therefore, the process of deduction yields the information on the levels of non-physical properties through the agency of a second premise. Moreover, as (12a-j) and (13a-g) illustrate, since the information on the intensity is inherent to the respective sensory adjectives, the convention on adjective meaning is at work.

In the aforementioned example, we must assume that the remarkableness and noticeability of a stimulus are also involved in the process of deduction. This is because the mere involvement of a high degree of a certain property leads to the overgeneralization of the meaning of a sensory adjective. The example in (14) indicates that such overgeneralization is unlikely, and the information on the remarkableness and noticeability of stimuli also determines the metaphorical meanings of the adjectives in (13a, b):

- (14) I swim and get {good/deep/#heavy/#bitter/#high/#sharp} sleep. It's my job to stay as functional as possible. (adapted from COCA)

In (14), sleep involves various degrees of depth. However, during sleep, a sleeper cannot recognize how deeply he or she is sleeping. To describe this state, the use of *deep* is possible because depth is sometimes unfathomable. For example, when plenty of water is present in a sea or river, its depth is indeterminable at first glance. Thus, it is hard to determine directly whether depth is remarkable and noticeable. By contrast, properties such as weight, bitterness, height, and sharpness are remarkable and noticeable because their degrees are easier to determine directly by touch, taste, or sight without using any instruments.

When we have access to the degrees of physical stimuli, we can understand other more specified information in addition to their degrees. Consider (15) and try to comprehend how the metaphorical meaning of an amount is understood:

- (15) As in Texas, anyone in Florida convicted of releasing one of the non-native snakes faces a *heavy fine*. (COCA)

The recipient understands the meaning in (15) based on his or her access to the

explicature of this utterance. In addition, the recipient has access to the following assumption: If something is heavy, its mass is large. From this assumption, it is understood that the amount of the fine is large. If this conclusion is understood as constituting the implicature of this utterance, a superordinate ad hoc concept HEAVY\* is constructed and applies to the extremity shared by the degrees of the amount of the fine and of physical heaviness. To summarize, if a sensory adjective collocates with a noun associated with a form of a sum (e.g., money), it is understood that the noun phrase refers to an amount. Moreover, the reader employs the assumption at the level of the intensity scale described by the metaphorical use of such an adjective, and this assumption serves as the second premise for deduction.

However, the mere involvement of the intensity of a property does not suffice in understanding the meaning of *heavy* in (15). Consider (16):

- (16) As in Texas, anyone in Florida convicted of releasing one of the non-native snakes faces a {high/#bitter/#sharp} fine.

Unlike the other two adjectives, *high* evokes an amount associated with height. From this fact, the involvement of both an amount and intensity leads to the understanding of the meaning of *heavy* in (15). This fact shows that both the conventional adjective meaning and collocation enable determining the metaphorical meanings of sensory adjectives describing an amount.

Next, we will see how the metaphorical meaning of a moral judgment is understood. Consider (17):

- (17) Does it come back to that *high morality* or religion or what is it for you?  
(COCA)

Similarly, in this example, the modified noun denotes a gradable property whose degree is specified by the metaphorical use of an adjective. Accordingly, the way of performing deduction is similar to those of (13a, b), in which the degrees of wind and focus are respectively described. The recipient understands the meaning in (17) by accessing both the explicature of this utterance and the following assumption: If something is high, its property is intense and excellent. From this assumption, it is understood that the morality in (17) is extreme and excellent. If this conclusion is understood as constituting the implicature of this utterance, a superordinate ad hoc concept HIGH\* is constructed and applies to the high level of intensity scale and a good quality shared by the degrees of morality and physical height. Therefore, the metaphorical meaning of this moral judgment is understood from the combination of sensory adjectives and the collocated nouns denoting morality, as in (1c). In that process of deduction, the reader employs the assumption at the level of the intensity scale described by the metaphorical use of such an adjective, and this assumption serves as the second premise for deduction. Consequently, the reader understands that sensory adjectives metaphorically describe the level of morality; thus, the meanings of the modified nouns determine this type of metaphorical meaning.

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In this example, too, the assumption about the goodness of a quality evoked from its use also leads to the understanding of its meaning, as (18) shows:

- (18) Does it come back to that {#sharp/#heavy} morality or religion or what is it for you?

Whereas *high* evokes the goodness of a quality in addition to that of height, *sharp* and *heavy* do not evoke such a meaning. This fact shows that the evocation of a favorable quality and its intensity leads to the understanding of the meaning of *high* in (17), and that the convention on adjective meanings and collocations determines this type of adjective meaning.

Next, consider (19) and how the difficulty of an activity is understood:

- (19) The tool was not meant for such *heavy labor* and threatened to buckle with each stab. (COCA)

The recipient understands the meaning in (19) by accessing the explicature of this utterance. In that process, the reader understands that the word *labor* refers to an unpleasant activity that involves difficulty in addition to the reader's access to the following assumption: If something is heavy, it is extreme and unpleasant. From this assumption, it is understood that the labor is extreme and unpleasant. Moreover, since a high degree of a difficult activity involves further difficulty, it is also understood from this adjective that the labor is difficult. If these two types of information are understood as constituting the implicature of this utterance, a superordinate ad hoc concept HEAVY\* is constructed and applies to the extremity shared by the activity levels of difficult, unpleasant activities and weight. The construction of this generalized ad hoc concept is possible because of the naturalness of *heavy* in (9e), which describes the difficulty of admission. Thus, a sensory adjective collocates with a noun that refers to a difficult unpleasant activity, such as *labor* and *task* as in (1f). To interpret the meanings of such collocations, the recipient employs the assumption at the level of an intensity scale and in a negative evaluation, and this assumption serves as the second premise for deduction. Thus, the recipient understands that sensory adjectives metaphorically describe the difficulty level of activities; thus, the meanings of the modified nouns determine this type of metaphorical meaning.

To understand the difficulty conveyed in (19), a negative evaluation stemming from the high level of intensity should also be evoked from sensory adjectives. Unlike *heavy*, a positive evaluation is evoked from *sharp*, *vivid*, and *high* in (20a-c), and thus the use of these adjectives sounds unnatural in the description of difficulty in (21):

- (20) a. And in a survival situation it has pretty *good sharp* edge to it. You could use that for cutting. (COCA)  
 b. There'll be a much more *vivid and attractive* television picture.

- (COCA)
- c. "Show those *nice high* ceilings," says the owner. (COCA)
- cf. The *heavy book* made the man depressed.
- (21) The tool was not meant for such {#sharp/#vivid/#high} labor and threatened to buckle with each stab.

This is because of the incompatibility of adjective meanings with the meanings of modified nouns that evoke negative aspects of activities that stem from their difficulties and painstaking aspects.

Next, we will establish how the metaphorical meanings of an evaluation are understood. When this type of metaphorical meaning is understood, the core function of describing an intensity scale and the evaluation of sensory experiences originally described by an adjective are at work. Consider (22):

- (22) The *cold reality* is that fewer than half of small businesses live to celebrate their third anniversary. (COCA)

In (22), the reader has access to the explication and the assumption concerning a low level of heat, the involvement of which is indicated by the interchangeability of *decreased* and *cold* in (12g). A low level of heat is a non-mild stimulus; thus, the reader has access to the following assumption: If something is cold, it is non-mild and unpleasant. From this explication and assumption, it is understood that the reality is negatively evaluated. Since such a characteristic of the reality is understood as the implicature, a superordinate ad hoc concept COLD\* is constructed to include the negative evaluations of reality and temperature. The interpretation of this expression indicates that the metaphorical meaning of an evaluation is also understood based on the core function of sensory adjectives in that such a metaphorical meaning is also dependent on the various points on the intensity scale of a certain property. In such a case, sensory adjectives originally describing immoderate stimuli usually evoke the unpleasantness and unfavorable aspects of a situation, depending on extra-linguistic knowledge; thus, a negative evaluation is reached. On the other hand, sensory adjectives originally describing mild stimuli usually evoke pleasantness; thus, a positive evaluation is derived, as in the use of the phrase *sweet sleep*. Although *high* also describes a positive evaluation, its metaphorical meaning can be understood differently; when modified nouns that denote favorable qualities (e.g., status) are collocated with *high*, they specify the high level of such qualities. In this case, the metaphorical meaning is understood through deduction, as demonstrated by the phrase *high morality* in (17).

Now, we will see how the assumption about immoderate physical stimuli usually contributes to the understanding of the negative evaluation connoted by *cold*. Consider (23):

- (23) The {harsh/tough/bitter} reality is that fewer than half of small businesses live to celebrate their third anniversary.

In (23), all the adjectives describe immoderate bodily sensations in their original senses. Since *cold* can be used instead of these adjectives without changing the metaphorical meaning of the negative evaluation, it is evident that the negative evaluation of non-mild physical properties is a crucial factor that leads to the understanding of this type of meaning. Moreover, in the description of an evaluation, the use of a noun denoting a non-gradable entity, such as *situation*, is sometimes involved.

Next, we will see how metaphorical meanings of psychological-emotional aspects are interpreted. Consider (24):

- (24) Jay Schadler: If in fact Mark Jensen was responsible for putting that pornography out there, what does it tell you about his mind?  
 Angelina Gabriele: It tells me that he is *cold*, sick, hateful, vengeful person. (COCA)

In (24), the listener (Jay Schadler) has access to the explicature of Angelina Gabriele's utterance. In this process, the listener understands that Gabriele is referring to Mark Jensen's mind. Moreover, the listener has access to the assumption on the low level of bodily heat and its emotional effect that is evoked by *cold*: If someone is cold, he or she is uncaring. Therefore, based on the explicature and this assumption, the listener understands the implicature that Mark Jensen is uncaring. If this state of being is understood as an implicature, a superordinate ad hoc concept COLD\* is constructed to include uncaringness and low temperature. As (24) demonstrates, if a sensory adjective is a predicate to a noun referring to a person, the recipient must determine whether the explicature content is applicable to the psychological-emotional state or physical state followed by the recipient's access to the intensity levels that are evocable from sensory adjectives. If the level of emotional property is thus specified, specific emotional states such as uncaringness are understood. The understanding of this meaning is achieved based on the specific context because the statement *he is cold* describes bodily coldness in another context.<sup>7</sup> As a result, the metaphorical meanings of the psychological-emotional aspects are understood. We will forgo a discussion on the metaphorical uses of sensory adjectives that collocate with nouns denoting emotions because the levels of intense feelings, such as anger, can be understood deductively in the same manner as demonstrated by the metaphorical descriptions of wind strength and the degree of focus in (13a, b), while the evaluation of feelings can be understood through deduction in the same manner as demonstrated in (22)-(23).

The link between physical coldness and uncaringness can be indicated by the following examples:

- (25) It tells me that he is {bloodless/senseless}, sick, hateful, vengeful

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<sup>7</sup> We should note, however, that this type of meaning is understood on the basis of collocation if sensory adjectives collocate with nouns denoting feelings in phrases such as *cold indifference*.



person.

As (25) shows, *cold* is interchangeable with *bloodless* and *senseless*. The uses of these two adjectives demonstrate that the physical state of being cold and the state of uncaringness are related based on the lack of sense stemming from the absence of blood flow. This is because the absence of blood flow leads to bodily coldness, and this type of coldness leads to the lack of sense and feelings. Hence, the reader has access to this assumption about low bodily heat for carrying out such deduction; thus, such an inference is not derived haphazardly. Therefore, extra-linguistic knowledge about the relationship between an emotional state and bodily state is at work.

However, unlike (22), the use of an adjective that originally describes immoderate stimuli does not necessarily describe a negative evaluation, as in (26a, b):

- (26) a. It was soon apparent that many of the audience were critical of the way in which the law is being administered. Some got extremely *hot* under the collar about it. (BNC)
- b. I heard it as an idea aimed at me more keenly than any flaming arrow, and it lit my body with a kind of *hot joy* I hadn't known for years. (COCA)

This is because both positive and negative emotions have various levels of intensity, and both of these types of emotions elicit the same type of bodily reactions, such as an increase in the body temperature when these types of emotions are intense. The involvement of such reactions is indicated in (27):

- (27) a. But Evelyn also *glowed with happiness*, which polished her unassuming beauty to a high gleam. (COCA)
- b. There he is, the mayor of North America's fourth most populous city, *glowing with derangement*, a kid gone utterly astray. (COCA)

For these reasons, the interrelationship between bodily states and the strength of emotions is a crucial factor that contributes to the understanding of the metaphorical meanings of sensory adjectives in the descriptions of emotions. Moreover, since the way emotion is evaluated depends on the types of emotions, the core function of sensory adjectives does not include the function of describing an evaluation. Instead, sensory adjectives possess the core function of describing the level of an intensity scale, and this function forms the basis of the aforementioned metaphorical meanings of sensory adjectives. This is because sensory adjectives chiefly describe gradable properties.

Thus far, we have expounded how the psychological-emotional aspects, evaluation, degree, moral judgment, amount, and difficulty involved in painstaking activities are understood metaphorically based on the commonality between the various meanings of sensory adjectives. The generalization of such meanings can be achieved

according to the intensity of perceivable properties. Based on this proposal, it has been demonstrated that such adjectives originally describe different points on the scale of perceivable properties, and the assumptions about these points or the degrees of such properties point toward understanding metaphorically the degree of other types of properties. The description of this information type is termed the core function of sensory adjectives, which thus have more specified functions depending on the conventional meanings of respective sensory adjectives, their noun collocations, extra-linguistic knowledge, and contexts. For this reason, for different adjective-noun combinations, there are different paths of deduction that lead to the understanding of their different meanings. Thus, the superordinate ad hoc concepts that are applicable to various meanings of a single adjective are constructed.

#### 4.3 On the Impossibility of Deduction

Thus far, we have seen how deduction contributes to the construction of ad hoc concepts. In this section, we will discuss why deduction is impossible in their unnatural metaphorical uses.

First, we will discuss why the metaphorical meanings of intensity and unpleasantness are difficult to understand in the metaphorical use of *sticky*, as in (28):

(28) # sticky mood (=(5))

As (29) indicates, *sticky* does not evoke an intense negative property, unlike *bitter* and *tough*:

(29) It's the scene of a very {bitter/tough/#sticky} battle between the Ukrainian government and the rebel forces. (adapted from COCA)

In (29), the uses of *bitter* and *tough* sound more natural in the description of the intensity of a battle. From this example, we can see that only *bitter* and *tough* evoke the intensity of a property. For this reason, it is difficult to understand the high level of intensity from the use of *sticky* in (28). Both the referents of the nouns *mood* and *battle* possess intensity, and the use of *sticky* is incompatible with such an aspect. By analyzing whether the level of physical stimuli is described by sensory adjectives, the unnaturalness of the metaphorical use of *sticky* and the difficulty in understanding its metaphorical meaning can be thus explained.

We will now discuss another restriction on the understanding of metaphorical meanings, using *sour*. Consider (30):

(30) # sour job  
(cf. bitter job)

Compared with the metaphorical use of *bitter*, that of *sour* sounds unnatural in (30); thus, the understanding of its metaphorical meaning involves a restriction.

If the referent of the modified noun possesses a high level of a certain intense property, such as wind strength, the metaphorical use of *sour* sounds unnatural in the description of an intense phenomenon, as in (31):

- (31) There was no wind, but the speed at which he traveled created a  
       {bitter/#sour} blast. (adapted from COCA)

This is because *bitter* originally collocates with a noun denoting a higher level of an unpleasant gustatory stimulus compared with that of *sour*, as (32) illustrates:

- (32) The taste of unripe fruit added a {bitter/?sour} astringency.

Since *bitter* describes a more intense property than *sour* does as in (32), this characteristic leads to the naturalness of *bitter* and the unnaturalness of *sour* in both (31) and (32). Furthermore, such a characteristic of the word *bitter* leads to its increased accessibility of the information at a high level of intensity.

Thus far, we have considered the unnatural metaphorical uses of sensory adjectives and have established why it is difficult or impossible to understand unnatural meanings. It was shown that some adjectives cannot describe a higher degree of a property compared with others in their original senses, and such a limitation constitutes a restriction on their natural metaphorical uses.

#### 4.4 On the Construction and Deduction of Ad Hoc Concepts

We have discussed the process of constructing superordinate ad hoc concepts that is applicable to deducing the metaphorical meanings of sensory adjectives. We have also observed the types of deductions needed to construct them. In this section, we will summarize our discussion. Section 4.1 explained how both the literal and metaphorical uses of sensory adjectives describe the intensity of various properties. In addition, section 4.2 detailed the construction of these concepts through deduction. When a recipient performs a deduction of meaning, he or she has access to assumptions about the intensity of various properties. This information constitutes the core function of sensory adjectives. However, as section 4.3 indicated, performing deductions involves placing restrictions on the meaning derivation stemming from lexical factors.

## 5 CONCLUSION

Sensory adjectives metaphorically describe the psychological-emotional aspects, evaluation, degree, moral judgment, amount, and difficulty involved in painstaking activities. We have attempted to generalize the patterns of meaning changes and have elucidated what characteristics such metaphorical meanings share in common. Furthermore, we have analyzed how metaphorical meanings are understood from the perspective of this common characteristic related to meaning—the core function of sensory adjectives. In our analysis, we have discussed the deduction process by considering their types of meanings and their collocations with nouns, which Wilson and Carston (2006) did not discuss in detail. In particular, we have claimed that the assumption about the degrees of properties or the points on the intensity scale shared between perception and non-physical states is involved in the process of deduction. Since the accessibility of assumptions concerning perceivable properties varies depending on the specific word in question, the consequences of some unnatural metaphorical uses of sensory adjectives render the understanding of certain metaphorical meanings difficult or impossible.

However, questions remain. First, to what degree does the core function of sensory adjectives contribute to the metaphorical interpretations of such adjectives? Second, does our proposal remain valid for creative metaphorical expressions that are devised to describe a new situation? Questions such as these point toward promising insights that may be gained through future studies.

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